

Application Note PH-185

SS32L Dissolved O₂ Probe



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BIOPAC Software

- BSL PRO v. 3.6.6

BIOPAC Hardware

- SS32L Dissolved O₂ Probe (includes electrolyte solution)

Other Hardware

SS32L Specifications

Components:

Dissolved O₂ Probe
Electrolyte Solution
Replacement Membrane Cap
Replacement O-ring
Tool
Solution Syringe

Compatible fluids:

Primarily, the sensor is intended for

- Culture tube (such as Pyrex® rimless 16x100mm or larger)
- Zero O₂ solution

measuring water, blood, or urine.

Note: Calibration procedures remain the same for each substance.

Type: galvanic; platinum and silver electrodes

Membrane: 2 Mil

Output: ___ mV per ___ mg/L

min. sample velocity: 20 cm/sec

Min. submersion depth?

Pressure:

Temperature Compensation:

Not required if calibration is made at the same temperature as testing.

Salinity Compensation: manual

Pressure Compensation: manual

Oxygen range: 0-40 ppm

Accuracy: ???

Temp range: ???

Response time:

Sample size: Minimum 2 ml

Sterilized: steam sterilizable

Lead content: yes

Probe body: ___ cm x ___ cm

Weight: ___ grams

Cable: 3 meters

Objective:

This Application Note will explain the functionality, calibration, recording and storage/care instructions for the BIOPAC Dissolved O₂ Probe (SS32L)

The probe can be used to determine the Biological Oxygen Demand (BOD) of organic matter.

Abstract:

This SS32L Dissolved O₂ Probe is designed to measure the amount of oxygen dissolved in a unit volume of a given liquid. The amount of dissolved oxygen that a liquid contains is influenced by pressure, temperature, and purity.

- As pressure decreases, DO₂ decreases.
- As temperature decreases, DO₂ increases.
- As purity decreases (i.e., salinity increases), DO₂ decreases.

A liquid is "saturated" when the pressure of the oxygen in the liquid equals the pressure of the oxygen in the air at a given temperature; water saturation usually occurs at 5-10ppm (particles per million).

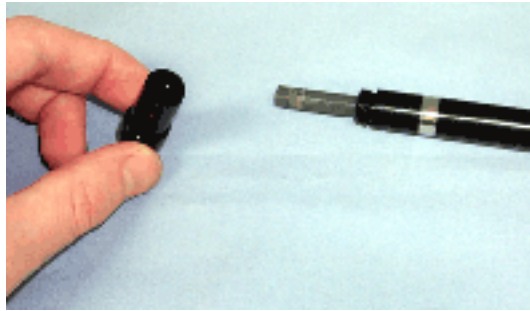
DO₂ is commonly used as a measurement of water quality and hydro-carbon co-monomer quality.

Notes For Taking Good Measurements:

- A. Allow a sufficient "warm-up" period before use (generally, 5-10 minutes should suffice).
- B. Keep the liquid moving across the surface of the membrane--stir the probe or stir the liquid--to prevent bubbles from collecting on the membrane tip, which will distort the O₂ reading.
- C. Allow the probe to "recharge" for 1-2 hours after you change the electrolyte solution or the membrane cap.
- D. Keep the membrane moist while the probe is connected to the MP30.
- E. Do not drop, shake or excessively impact the probe.

Setup:

1. **First use:** Unscrew the probe tip, fill it with electrolyte solution, screw the tip back on.

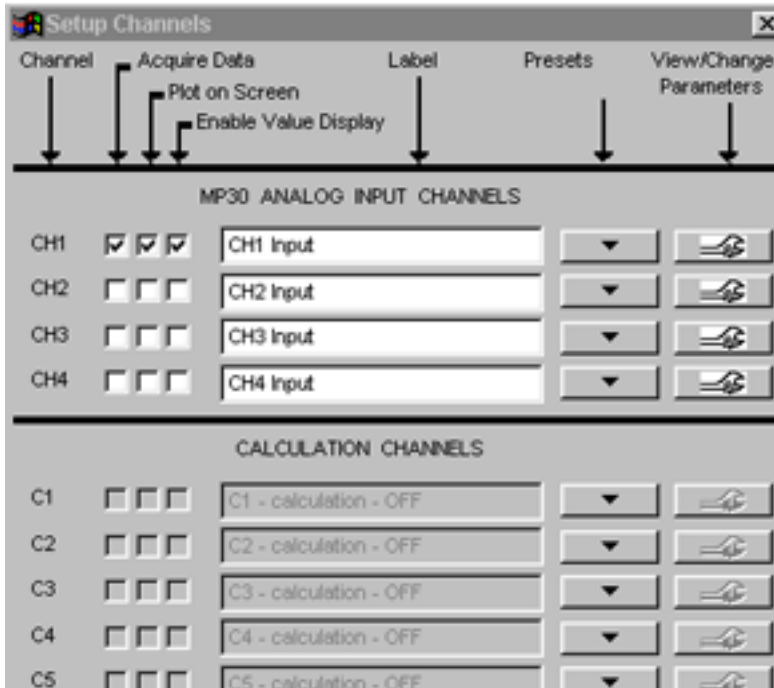


2. Remove the protective cap and immerse the probe in water for 2-3 hours before first use.
3. Plug the **SS32L** cable into a channel on the MP unit, and fasten the screws on either side of the attachment.
4. Immerse the probe in Zero O₂ Solution.
5. Turn on the MP unit.
6. Launch the BSL *PRO* software.
7. Wait for about 10 minutes as a probe "warm up" period.
 - You must repeat the warm up period any time the probe is disconnected from the MP30 unit.

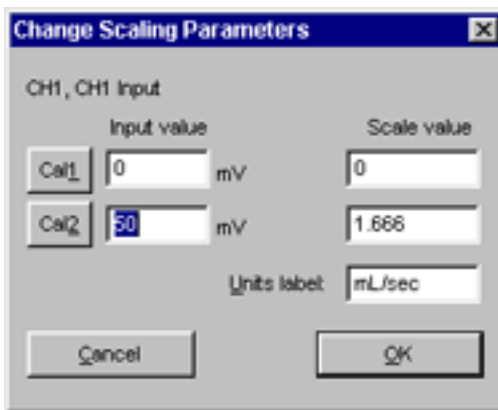
Procedure:

- Calibration:

1. In BSL *PRO* click MP30>Setup Channels.
2. In the Setup Channels dialog, activate the three check boxes next to the "CH1" label by clicking inside them



3. In that same row, click the "View/Change Parameters" wrench icon to generate the Input Channel Parameters dialog.
4. Click the "Scaling" button.
5. In the Change Scaling Parameters dialog, label the units "mg/L" for milligrams per liter or "ppm" for particles per million (equal measures).
 - To use units of % saturation, click here.



Cal 1:

6. Stir the probe and Click Cal 1.
 - Calibration values should fall in the range of 0.2-0.5 V. If your values vary, move the probe to release a possible bubble on the tip.



Keep the liquid moving across the membrane surface to prevent air bubbles.

7. Set Cal 1 Scale value to 0.
8. Rinse the probe tip and blot it dry.
9. Immerse the probe tip in air-saturated water.
10. Wait one minute, then stir the probe and Click Cal 2.
11. Click "OK" and close out of any remaining dialog boxes.
12. Rinse the probe tip and blot it dry.

Cal 2

13. Immerse the probe in a calibration standard.
14. Click Cal 2.
15. Set Cal 2 Scale Value to known value --> see chart for lab [temp/pressure adjustment](#).
16. Label the units %.
17. Click "OK" and close out of any remaining dialog boxes.
18. Rinse the probe tip and blot it dry.

· Experiment:

Dissolved O₂:

1. Immerse the probe in the liquid sample.
2. Click on the **Start** button in the *PRO* software.
3. Stir the probe for one minute or more.

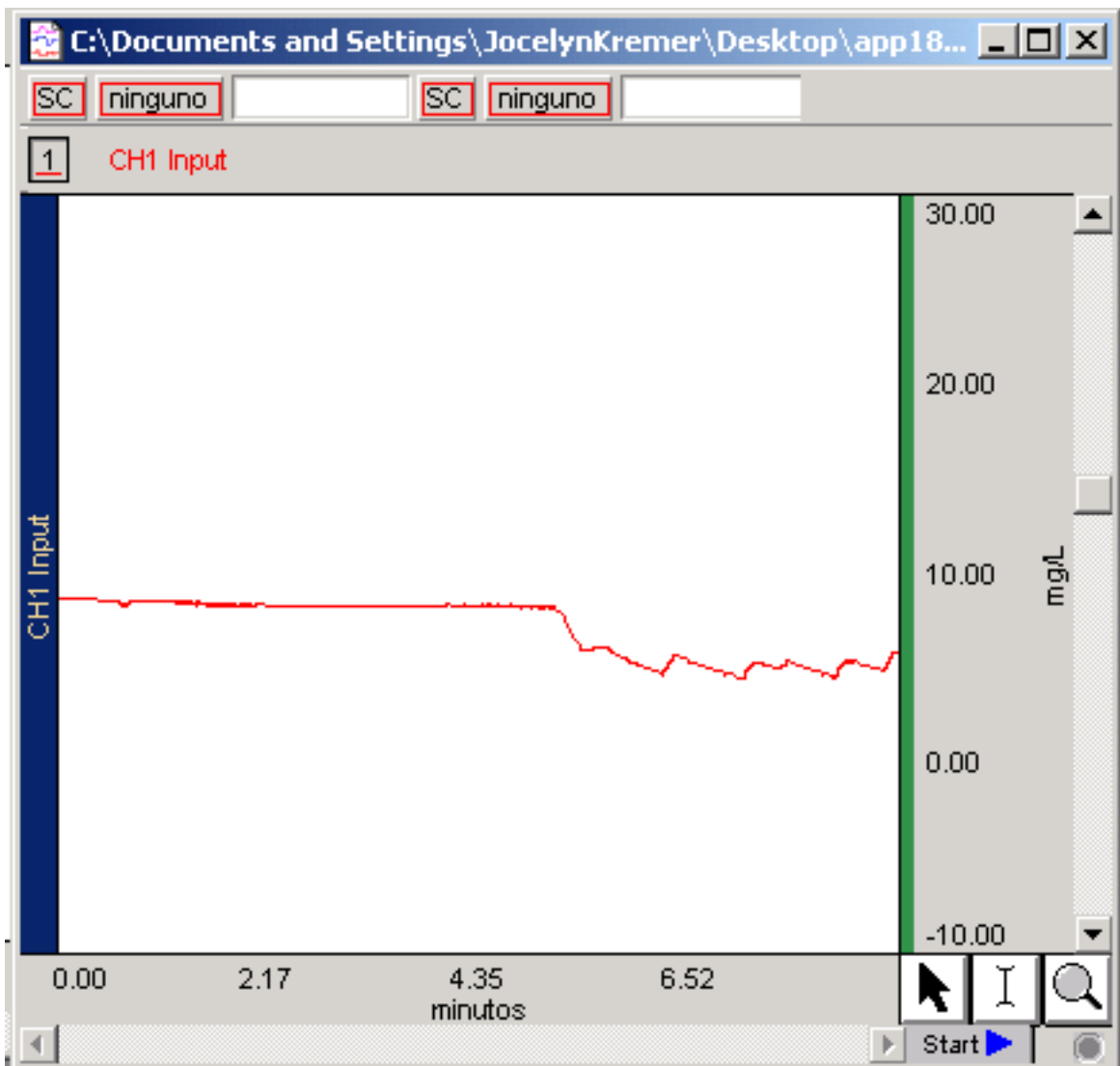
4. Click on the **Stop** button in the *PRO* software.
5. Rinse the probe drip and blot it dry.

BOD Option:

1. Collect two water samples.
2. Measure the dissolved O₂ (ppm) of one sample.
3. Store the other sample at 20°C/68°F for 5 days in complete darkness.
 - Use an incubator or wrap the sample bottle in aluminum foil or black electrical tape and store it in a dark place at room temperature (20°C/ 68°F).
4. After 5 days, measure the dissolved O₂ (ppm) of the stored sample.
5. Subtract the Day 5 reading from the Day 1 reading to determine the BOD level (ppm).

Analysis:

Total volume of dissolved O₂



1. Open your data file.
 2. Set a measurement for "value."
 3. Click the cursor on a point and review the result.
- If the signal value varies widely, measure the peak two or three times and average your results.

Care of the SS32L

· Cleaning & Storage

- Rinse the dissolved O₂ probe with tap water after use and before storage.
- Use a bristle brush to remove deposits as necessary.
- Periodically replace the membrane cap.
- Periodically replace the electrolyte solution.
- For short-term storage (<24 hours), leave the probe immersed in water.
- For long-term storage (>24 hours) unscrew the probe tip and empty the electrolyte solution, then rinse, dry and replace the tip.



Unscrew the tip to fill/empty the electrolyte solution

· Maintenance

- **Replacing the Membrane Cap and/or O-ring**

1. Unscrew the tip.
2. Align the TOOL against the membrane cap and push it through the tip to release the cap.



3. As necessary, remove and reseal the O-ring from the tip.



O-ring at end of tip

4. Insert the new membrane cap (membrane down) into the tip.
5. Hold the probe and use the TOOL to push the cap securely into the tip.
 - Hold the probe to prevent pressure against the membrane surface, such as might occur if you pushed down on the cap while it was resting on a surface.
6. Use the syringe to fill the tip about 2/3 full (??ml) of electrolyte solution, tap it to release any bubbles, and then screw it back on.
7. Wait 2-24 hours before using the probe.

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